

CLAIMS

I claim:

- 1 1. A laser system for destroying bacteria in a
2 bacterial locale, said system comprising:
 - 3 (a) a housing and a control;
 - 4 (b) a laser oscillator sub-system within said housing
5 for causing the selective emission under said control of
6 first radiation in a first wavelength range of 865 nm to 875
7 nm, and the selective emission under said control of second
8 radiation at a second wavelength range of 925 nm to 935 nm;
 - 9 (c) an optical channel for transmission of said first
10 radiation and said second radiation from said laser
11 oscillator sub-system; and
 - 12 (d) a head for enabling delivery of said first
13 radiation and said second radiation from said laser
14 oscillator sub-system through said optical channel to the
15 site of said bacterial locale;
 - 16 (e) said first radiation and said second radiation
17 being adapted to activate a chromophore from said bacterial
18 locale and being adapted to cooperate with said chromophore
19 to destroy bacteria in said bacterial locale.
- 1 2. The laser system of claim 1 wherein said
2 transmission is simultaneous.
- 1 3. The laser system of claim 1 wherein said
2 transmission is alternate.

1 4. The laser system of claim 1 wherein said
2 transmission is multiplexed.

1 5. The laser system of claim 1 wherein said head
2 includes an optical egress for said first radiation and said
3 second radiation, and a scaling instrument.

1 6. The laser system of claim 1 wherein said head
2 includes an optical egress having a frosted tip.

1 7. The laser system of claim 1 wherein said head
2 includes an optical egress and an otoscope.

1 8. The laser system of claim 1 wherein said head
2 includes a digit clip and an optical egress therefrom.

1 9. The laser system of claim 1 wherein said head
2 includes a stocking having an optical ingress from said
3 laser oscillator and an optical egress to the inner surface
4 of said stocking.

1 10. The laser system of claim 1 wherein said head
2 includes a handle and an optical egress extending therefrom.

1 11. A laser system for destroying bacteria in a
2 bacterial locale, said system comprising:

3 (a) a housing and a control;

1 (b) a laser oscillator sub-system within said housing
2 for causing the selective emission under said control of
3 first radiation narrowly at a first wavelength of
4 substantially 870 nm and the selective emission under said

5 control of second radiation at a second wavelength of
6 substantially 930 nm;

7 (c) a head for delivering said first radiation and
8 said second radiation from said laser oscillator sub-system
9 to the site of said bacterial locale; and

10 (d) said first radiation and said second radiation
11 being adapted to activate a chromophore from said bacterial
12 locale and being adapted to cooperate with said chromophore
13 to destroy bacteria in said bacterial locale.

1 12. The laser system of claim 11 wherein said
2 transmission is simultaneous.

1 13. The laser system of claim 11 wherein said
2 transmission is alternate.

1 14. The laser system of claim 11 wherein said
2 transmission is multiplexed.

1 15. The laser system of claim 11 wherein said head
2 includes an optical egress for said first radiation and said
3 second radiation, and a scaling instrument.

1 16. The laser system of claim 11 wherein said head
2 includes an optical egress having a frosted tip for
3 insertion into a root canal.

1 17. The laser system of claim 11 wherein said head
2 includes an optical egress and an otoscope.

1 18. The laser system of claim 11 wherein said head
2 includes a digit clip and an optical egress therefrom.

1 19. The laser system of claim 11 wherein said head
2 includes a stocking having an optical ingress from said
3 laser oscillator and an optical egress to the inner surface
4 of said stocking.

1 20. The laser system of claim 11 wherein said head
2 includes a handle and an optical egress extending therefrom.

1 21. A process for destroying bacteria in a bacterial
2 locale, said process comprising:

1 (a) energizing a laser to cause the selective emission
2 of first radiation in a first wavelength range of 865 nm to
3 875 nm and the selective emission of second radiation at a
4 second wavelength range of 925 nm to 935 nm;

5 (b) establishing a path for the transmission of said
6 first radiation and said second radiation from said laser
7 oscillator sub-system; and

8 (c) enabling delivery of said first radiation and said
9 second radiation from said laser oscillator sub-system
10 through said optical channel to the site of said bacterial
11 locale;

12 (d) said first radiation and said second radiation
13 activating a chromophore from said bacterial locale and
14 cooperating with said chromophore to destroy bacteria in
15 said bacterial locale.

1 22. A process for destroying bacteria in a bacterial
2 locale, said process comprising:

1 (a) energizing a laser to cause the selective emission
2 of first radiation in the selected wavelength of 870nm and
3 the selective emission of second radiation in the selective
4 wavelength range of 930nm;

5 (b) establishing a path for the transmission of said
6 first radiation and said second radiation from said laser
7 oscillator sub-system; and

8 (c) enabling delivery of said first radiation and said
9 second radiation from said laser oscillator sub-system
10 through said optical channel to the site of said bacterial
11 locale;

12 (d) said first radiation and said second radiation
13 activating a chromophore from said bacterial locale and
14 cooperating with said chromophore to cause a reaction with
15 bacteria in said bacterial locale.

1 23. The process of claim 22 wherein said bacteria is
2 E. coli.

1 24. The process of claim 22 wherein said reaction is a
2 toxic singlet oxygen reaction.

1 25. A laser process comprising destroying bacteria in
2 an infected locale by a reaction resulting from application
3 to said infected locale of laser radiation, which is
4 primarily of two wavelength ranges that are generated by a
5 laser system:

6 (a) said bacteria including E. coli;

7 (b) said system comprising:

8 (1) a housing and a control;

9 (2) a laser oscillator sub-system within said housing
 10 for causing the selective emission under said control of
 11 first radiation that is primarily in a first wavelength
 12 range of 865 nm to 875 nm, and the selective emission under
 13 said control of second radiation at a second wavelength
 14 range that is primarily in a wavelength range of 925 nm to
 15 935 nm;

16 (3) an optical channel for transmission of said first
 17 radiation and said second radiation from said laser
 18 oscillator sub-system; and

19 (4) a head for enabling delivery of said first
 20 radiation and said second radiation from said laser
 21 oscillator sub-system through said optical channel to the
 22 site of said bacterial locale;

23 (5) said first radiation and said second radiation
 24 activating a chromophore from said bacterial locale and
 25 cooperating with said chromophore to destroy said bacteria
 26 in said bacterial locale.

1 26. A laser process comprising destroying bacteria in
 2 an infected locale by a reaction resulting from application
 3 to said infected locale of laser radiation, which is
 4 primarily of two wavelength ranges that are generated by a
 5 laser system, said system comprising:

6 (a) a housing and a control;

7 (b) a laser oscillator sub-system within said housing
8 for causing the selective emission under said control of
9 first radiation that is primarily in a first wavelength
10 range of 865 nm to 875 nm, and the selective emission under
11 said control of second radiation at a second wavelength
12 range that is primarily in a wavelength range of 925 nm to
13 935 nm;

14 (c) an optical channel for transmission of said first
15 radiation and said second radiation from said laser
16 oscillator sub-system; and

17 (d) a head for enabling delivery of said first
18 radiation and said second radiation from said laser
19 oscillator sub-system through said optical channel to the
20 site of said bacterial locale;

21 (e) said first radiation and said second radiation
22 activating a chromophore from said bacterial locale and
23 cooperating with said chromophore to destroy said bacteria
24 in said bacterial locale;

25 (f) said reaction being a toxic singlet oxygen
26 reaction.

1 27. A dental process comprising scaling an infected
2 locale and destroying bacteria in said infected locale by a
3 reaction resulting from application to said infected locale
4 of laser radiation, which is primarily of two wavelength

5 ranges that are generated by a laser system, said system
6 comprising:

7 (a) a housing and a control, said system comprising a
8 head that includes a dental scaler and an optical egress in
9 close proximity;

10 (b) a laser oscillator sub-system within said housing
11 for causing the selective emission under said control of
12 first radiation that is primarily in a first wavelength
13 range of 865 nm to 875 nm, and the selective emission under
14 said control of second radiation at a second wavelength
15 range that is primarily in a wavelength range of 925 nm to
16 935 nm;

17 (c) an optical channel for transmission of said first
18 radiation and said second radiation from said laser
19 oscillator sub-system;

20 (d) said head enabling delivery of said first
21 radiation and said second radiation from said laser
22 oscillator sub-system through said optical channel to the
23 site of said bacterial locale;

24 (e) said first radiation and said second radiation
25 activating a chromophore from said bacterial locale and
26 cooperating with said chromophore to destroy said bacteria
27 in said bacterial locale; and

28 (f) said reaction being a toxic singlet oxygen
29 reaction.

1 28. A dental process comprising:

2 (a) inserting a mechanical probe into an infected root
3 canal to expose said root canal;

4 (b) removing said mechanical probe from said infected
5 root canal;

6 (c) inserting an optical probe into said infected root
7 canal to cause a reaction in bacteria in said infected root
8 canal by transmission of laser radiation from said optical
9 probe to bacteria in said infected root canal;

10 (d) said laser radiation consisting essentially of one
11 or both of a first radiation and a second radiation, said
12 first radiation being primarily in a first wavelength range
13 of 865 nm to 875 nm, and said second radiation being
14 primarily in a second wavelength range of 925 nm to 935 nm;

15 (e) said first radiation and/or said second radiation
16 activating a chromophore in said bacterial locale and
17 cooperating with said chromophore to destroy said bacteria;

18 (f) said reaction being a toxic singlet oxygen
19 reaction;

20 (g) removing said optical probe from said root canal;
21 and

22 (h) filling said root canal with a dental prosthesis.

1 29. The process of claim 28 wherein said bacteria is
2 E. coli.

1 30. A therapeutic process comprising:

2 (a) inserting a diseased digital member into a clip
3 having a pair of opposed elements;

4 (b) said opposed elements having optical egresses in
5 communication with opposed sections of said digital member;

6 (c) causing a reaction in bacteria in said diseased
7 digital member by transmission of laser radiation from said
8 optical egresses to said bacteria;

9 (d) said laser radiation consisting essentially of one
10 or both of a first radiation and a second radiation, said
11 first radiation being primarily in a first wavelength range
12 of 865 nm to 875 nm, and said second radiation being
13 primarily in a second wavelength range of 925 nm to 935 nm;

14 (e) said first radiation and/or said second radiation
15 activating a chromophore in said bacteria and cooperating
16 with said chromophore to destroy said bacteria;

17 (f) said reaction being a toxic singlet oxygen
18 reaction.

1 31. The process of claim 30 wherein said bacteria is
2 E. coli.

1 32. A therapeutic process comprising:

2 (a) inserting an otoscope into an infected ear canal;

3 (b) said otoscope having an optical egress in
4 communication with said ear canal;

(c) causing a reaction in bacteria in said infected ear canal by transmission of laser radiation from said optical egress to said bacteria;

(d) said laser radiation consisting essentially of one or both of a first radiation and a second radiation, said first radiation being primarily in a first wavelength range of 865 nm to 875 nm, and said second radiation being primarily in a second wavelength range of 925 nm to 935 nm;

(e) said first radiation and/or said second radiation activating a chromophore in said bacteria and cooperating with said chromophore to destroy said bacteria;

(f) said reaction being a toxic singlet oxygen reaction.

33. A therapeutic process comprising:

(a) subjecting a diseased anatomical local to laser radiation;

(b) causing a reaction in bacteria in said diseased locale by transmission of laser radiation to said bacteria;

(c) said laser radiation consisting essentially of one or both of a first radiation and a second radiation, said first radiation being primarily in a first wavelength range of 865 nm to 875 nm, and said second radiation being primarily in a second wavelength range of 925 nm to 935 nm;

11 (d) ` said first radiation and/or said second radiation
12 activating a chromophore in said bacteria and cooperating
13 with said chromophore to destroy said bacteria;
14 (e) said reaction being a toxic singlet oxygen
15 reaction.